

Date: Tue, 8 Nov 94 04:30:40 PST  
From: Ham-Homebrew Mailing List and Newsgroup <ham-homebrew@ucsd.edu>  
Errors-To: Ham-Homebrew-Errors@UCSD.Edu  
Reply-To: Ham-Homebrew@UCSD.Edu  
Precedence: List  
Subject: Ham-Homebrew Digest V94 #330  
To: Ham-Homebrew

Ham-Homebrew Digest                      Tue, 8 Nov 94                      Volume 94 : Issue 330

Today's Topics:

                    About the Digest version of this  
                            Butterworth: butter.c  
                            Colpitts Osc Design Info  
                            Filter programs.  
            Help needed with older Kenwood HF model 9R59D  
                            Local TV Jamming  
            Looking for schematic for Pulser MB200

Send Replies or notes for publication to: <Ham-Homebrew@UCSD.Edu>  
Send subscription requests to: <Ham-Homebrew-REQUEST@UCSD.Edu>  
Problems you can't solve otherwise to brian@ucsd.edu.

Archives of past issues of the Ham-Homebrew Digest are available  
(by FTP only) from UCSD.Edu in directory "mailarchives/ham-homebrew".

We trust that readers are intelligent enough to realize that all text  
herein consists of personal comments and does not represent the official  
policies or positions of any party. Your mileage may vary. So there.

-----  
Date: 7 Nov 94 15:02:52 GMT  
From: mack@mails.imed.COM  
Subject: About the Digest version of this

It appears that MANY of you receive each message for this group as an individual  
message. Many others (like myself) receive a big glob of messages once a day.  
This is the reference to "Digest" in some of my posts. For those wishing to  
subscribe to the digest version here is the header from the digest:

BEGIN QUOTE

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END QUOTE

I hope this helps clear up some of the questions.

Ray Mack  
WD5IFS  
mack@mails.imed.com

-----  
Date: Sun, 6 Nov 1994 17:31:26 GMT  
From: novatech@eskimo.com (Steven Swift)  
Subject: Butterworth: butter.c

/\*\*\*\*\*

COPYRIGHT 1987 Steven D. Swift  
Rights to copy are granted provided that the  
program is neither sold nor used for commercial  
purposes and that this notice stay with all  
copies.

history:

rev 0:	november 02, 1987	Steven D. Swift, P.E. Seattle, Washington
rev 1:	august 31, 1990	updated array initialization modified number of digits in out

\*\*\*\*\*  
butter.c

this program calculates the component values for  
nth order butterworth filters. Either low pass  
or high pass, with either capacitive or inductive  
inputs. The input and output load are restricted  
to being the same value and resistive, e.g; 50 ohms.  
No other restrictions are placed on the values and  
the program does not check for standard values.  
Although the output is in a form most appropriate for

filters that end up with L's in uH and C's in pF.

The formulas used in this program and the examples used to test it came from:

Introduction to Radio Frequency Design,  
W.H. Hayward, Prentice-Hall 1982.

Required inputs are:

Fc:                   3db frequency, in MHz  
Ro:                   source and load impedance, in ohms  
n:                    order of desired filter  
hp or lp:            type of filter  
cap or ind:          input stage, capacitive or inductive

The outputs are:

component value, inductor or capacitor indicated by  
units printed.

-----

\*\*\*\*\*/

```
#include <stdio.h>
#include <math.h>
```

```
float L[25] ;           /* inductors      */
float C[25] ;           /* capacitors    */
float g[25];            /* coefficient register */
```

```
main()
{
```

```
float pi = 3.141592654;
double sin();           /* need sine to calculate coef */
int k = 0;              /* counter for coefficients */
float Fc ;              /* 3dB cutoff frequency hertz */
float Wc ;              /* 3dB cutoff frequency radians */
float Ro = 50.0;        /* source and load impedance */
int input;              /* alpha for inductive input */
                        /* alpha for capacitive input */
int n = 3;              /* order of filter */
int i = 0;              /* dummy counter */
```

```

int type;                                /* type of filter: lp or hp      */
float meg = 1000000.0;

/* input user chosen variables first */

printf("\n\nBUTTERWORTH FILTER PROGRAM\n\n");

printf("Input the order of the filter (25 max): ");
scanf("%d", &n);
printf("\n");

if(n>25){
    printf("\nOrder too large!\n");
    exit();
}

init(n);                                /* initialize arrays to all zeroes */

printf("Input the type of filter (1=hp or 2=lp): ");
scanf("%d", &type);
printf("\n");

printf("Type of input stage (1=ind or 2=cap): ");
scanf("%d", &input);
printf("\n");

printf("Input cutoff frequency (MHz): ");
scanf("%f",&Fc);
Wc = 2*pi*Fc*meg;
printf("\n");

printf("Input source and load resistance (ohms): ");
scanf("%f",&Ro);
printf("\n");

/*
calculate normalized filter coefficients and store them in
the array g[]
*/

for(i = 1; i <= n; i++)
    g[i] = 2*sin( (2*i-1)*pi/(2*n) );

/*

```

test for types of filters and input stage, then perform the appropriate calculations by calling the appropriate function. these functions do not return values, but modify the arrays L[] and C[] directly, getting inputs from the variables typed in by the user and from g[].

\*/

```

if ( (type==1) && (input==1) )
    for( i = 1; i <= n ; i++)
        hpind(Wc,g[i],Ro,i);

else if ( (type==2) && (input==2) )
    for( i = 1; i <= n ; i++)
        lpcap(Wc,g[i],Ro,i);

else if ( (type==1) && (input==2) )
    for( i = 1; i <= n ; i++)
        hpcap(Wc,g[i],Ro,i);

else if ( (type==2) && (input==1) )
    for( i = 1; i <= n ; i++)
        lpind(Wc,g[i],Ro,i);

else printf("Type of filter incorrect. Please try again.\n\n");

output(n,Fc);    /* output results */
}

```

/\* all the functions used by main are located starting here \*/

hpcap(x,y,z,k) /\* x is radian freq, y is gk, z is Ro and k is count \*/

```

float x,y,z;
int k;
{
    if(isodd(k)==1)
        C[k] = 1.0/(x*y*z);
    else
        L[k] = z/(x*y);
}

```

hpind(x,y,z,k) /\* x is radian freq, y is gk, z is Ro and k is count \*/

```

float x,y,z;
int k;

```

```

    {
    if(isodd(k)==0)
        C[k] = 1.0/(x*y*z);
    else
        L[k] = z/(x*y);

    }

lpcap(x,y,z,k)          /* x is radian freq, y is gk, z is Ro and k is count */

    float x,y,z;
    int k;
    {
    if(isodd(k)==1)
        C[k] = y/(z*x);
    else
        L[k] = (y*z)/x;
    }

lpind(x,y,z,k)          /* x is radian freq, y is gk, z is Ro and k is count */

    float x,y,z;
    int k;
    {
    if(isodd(k)==0)
        C[k] = y/(z*x);
    else
        L[k] = (z*y)/x;
    }

/* isodd tests if an integer is odd or not, for use in finding
   whether or not to calculate an L or a C element */

isodd(x)

int x;
{
    int i=1;
    if ( (x % 2) == 0)
        i=0;          /* returns 0 if even, 1 if odd */
    return(i);
}

/* output(): prints out the results of the program */

```

```

output(n,f)

float f;
int n;
{
    int i;
    printf("\nValues for %d order Butterworth filter @ %.4e MHz",n,f);
    printf("\n Element      Inductors      Capacitors\n\n");

    for (i=1; i<=n; i++)
    {
        if (L[i]>0)
            printf("  #: %d          %.3f uH\n",i,L[i]*1.0e6);
        if (C[i]>0)
            printf("  #: %d          %.2f pF\n",i,C[i]*1.0e12);
    }
}

/* initialize array variables */

init(n)
int n;
{
    int i;
    for (i=0; i<=n; i++)
    {
        g[i] = 0.0;
        L[i] = 0.0;
        C[i] = 0.0;
    }
}

/* that's the end */

--

```

Steven D. Swift, P.E. ( novatech@eskimo.com )  
 NOVATECH INSTRUMENTS, INC.  
 1530 Eastlake Avenue East, Suite 303

-----  
 Date: Sun, 6 Nov 1994 15:42:19 GMT  
 From: dshalita@rogue.com (David Shalita)  
 Subject: Colpitts Osc Design Info

Does anyone have a reference where I can get some very detailed information about how to design Colpitts LC Oscillators? RF Design magazine offers a "Oscillator Design" booklet, but I am not certain this is info for a

person with no oscillator design experience. I have several Radio Amateur Handbooks and several QRP series books which never quite offer enough detail in choosing the coupling and the 2 feed back capacitors.

73 and thanks, Dave W6MIK  
dshalita@rogue.com

--

Internet : dshalita@rogue.com  
AMPR.ORG :lp.w6mik.ampr.org [44.16.0.29]  
AMPR.ORG :w6mik.ampr.org [44.16.0.26]  
7833 Cantaloupe Ave. Van Nuys, CA 91402

-----

Date: Sun, 6 Nov 1994 17:29:48 GMT  
From: novatech@eskimo.com (Steven Swift)  
Subject: Filter programs.

I often see requests for filter design programs on this newsgroup. Over the past few years I have slapped together a few programs to calculate the values of L-C filters for Butterworth, Chebychev and Elliptical responses. The elliptical program is just a translation of a basic program I received a while back.

I am not a programmer, so the programs aren't clean, but I have checked them against many examples and I have built examples of filters from each program. My big plan is to combine them into one-- if anyone does this, I'd like a copy.

The three posting to follow are:

Butterworth: butter.c  
Chebychev: cheb.c  
Elliptical: elip.c (includes elip.bas)

Comments and improvements welcomed. Have fun.

--

Steven D. Swift, P.E. ( novatech@eskimo.com )  
NOVATECH INSTRUMENTS, INC.  
1530 Eastlake Avenue East, Suite 303

-----

Date: 7 Nov 1994 20:19 -0500  
From: hirschj@vax2.concordia.ca (JACK HIRSCHBERG)



Does anyone have schematics or specs for this unit. I need to know the values of a coil. Please email at:  
HIRSCHJ@vax2.concordia.ca

Thanks,  
Jack

Instead of jamming the station (quite complex), why don't you build a notch filter? Or even better, you can buy these things for about \$25 for tunable filters and about \$40 for fixed channel notches. They are usually around 60+db down, more than enough for even the strongest stations. Usually you can find ads for these things in the back of Popular Electronics and other magazines like that. I think they are available up to about channel 35 or so. They are used by many cable companies to block out premium channels. Good luck..

Legal stuff:

The above opinions are my own and not necessarily those of the staff, faculty, administration, or lab animals (woof!) of The University of Texas Health Science Center at San Antonio or anyone else who is not me.

Liberals measure compassion by how many people they are helping.  
Conservatives measure compassion by how many people no longer need  
their help.

-- Jack Kemp

```
| I am Voltohm of Borg!  
| Resistance is  $E/I$ !  
| Power is  $EI$ !
```

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-----  
Date: 6 Nov 1994 22:33:50 -0500  
From: mike@io.org (Mike Stramba)  
Subject: Looking for schematic for Pulser MB200

Anyone familiar with a Pulser MB200?

I'd like to get a schematic for it for the purpose of trying to add a  
bfo to it to receive ssb.

Also, I'd appreciate any information on how to do this mod, or if  
it's even possible.

Mike

--

=====

Mike Stramba	Email: mike@io.org
Toronto, Canada	Internex Online - Toronto, Canada (416) 363-3783

=====

-----  
Date: Sat, 5 Nov 1994 20:16:44 GMT  
From: jeffrey@kahuna.tmc.edu (Jeffrey Herman)

References<kludgeCyK1p5.95D@netcom.com> <395svn\$ksa@kelly.teleport.com>,  
<1994Nov2.015906.8454@ke4zv.atl.ga.us>  
Reply-To: jeffrey@math.hawaii.edu  
Subject: Re: THE LITTLE RAZOR BLADE RADIO (UPDATE)

I sure hope someone is collecting all these articles and will find  
an archive site for them. This topic is quite interesting, and reading  
it is like taking a step back in time. It's almost as if we're seeing  
radio receivers invented all over again.

Now we need some ideas concerning basic transmitters.

Jeff NH6IL

-----  
Date: Sat, 5 Nov 1994 01:10:08 GMT  
From: gary@ke4zv.atl.ga.us (Gary Coffman)

References<1994Oct25.204901.20098@arrl.org>

<1994Oct29.173008.10434@ke4zv.atl.ga.us>, <1994Nov2.150552.5065@arrl.org>  
Reply-To: gary@ke4zv.atl.ga.us (Gary Coffman)  
Subject: Re: Where does the power go?

In article <1994Nov2.150552.5065@arrl.org> zlau@arrl.org (Zack Lau (KH6CP))  
writes:

>Gary Coffman (gary@ke4zv.atl.ga.us) wrote:

>

>: Class AB1 amplifiers routinely achieve 65% efficiency from DC input  
>: to RF output in VHF TV broadcast service. Tubes certainly aren't  
>: 100% efficient, but that's not because of some output impedance  
>: resistor. It's because of contact resistance, back bombardment,  
>: and plain old  $I^2R$  losses in the tube structure. Every attempt  
>: is made to minimize these losses. Tube contact surfaces are silver  
>: plated, and made large, tube structure lengths are minimized, and  
>: suppressor grids are used in some cases. Flowing 12 amps at 8 kV  
>: can cause a tube, and cavity, to heat, but not 48 kW worth.

>

>8000V/12 amps\*.35=233 ohms

>

>Can you further break down these losses--how much is  
>due to to each factor? I have to admit that I'm surprised  
>that contact losses would be worth mentioning, particularly  
>since they involve large, silver plated surfaces. I use  
>cheap molex connectors with little tin plated contacts, and  
>they aren't significant in a circuit with involving 2 amps  
>at 12 volts (12V/2amps=6 ohms).

Well, obviously, the largest loss component is the kinetic energy  
of the electron beam striking the plate. For the tube above, you  
have about 0.0024 gm of electrons hitting the plate at an appreciable  
fraction of the speed of light every second ( haven't worked out exactly  
what the transit time is for that tube, but since it's for VHF service,  
it's certainly short). That kinetic energy ( $.5mv^2$ ) has to be dissipated  
as heat. That's why the tube has anode cooling fins. But the contact  
resistance contributes enough that fingerstock sometimes unsolders itself,  
and circulating currents can heat the cavities significantly. I've had  
tuning plunger fingerstock unsolder itself too. The app notes from the  
various manufacturers have detailed data on the various thermal loads  
presented by their particular devices/sockets/cavities. I know that  
with the 5 hp blowers we use, stack temperature runs about 220-240 F  
three feet above the tube. I also know I can get that stack temperature  
with no drive by increasing the static bias current. Most of the heating  
is not RF heating. The filaments draw 300 amps at 5 volts which is 1500  
watts, and that's only a small fraction of the heat load of the system.

Gary

--

Gary Coffman KE4ZV		You make it,		gatech!wa4mei!ke4zv!gary
Destructive Testing Systems		we break it.		emory!kd4nc!ke4zv!gary
534 Shannon Way		Guaranteed!		gary@ke4zv.atl.ga.us
Lawrenceville, GA 30244				

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End of Ham-Homebrew Digest V94 #330

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